Name:
Enrolment No:

UNIVERSITY OF PETROLEUM & ENERGY STUDIES

End Semester Examination – December 2023

Program: BBA | **Semester: I**
Subject/Course: Business Mathematics | **Max. Marks: 100**
Course Code: DSQT1001 | **Duration: 3 Hours**

Q.No.	Section A	10Q×2M=20M	COs
	Question	**Marks**	**COs**
1.	A is a square matrix and all the elements of one column are zero then determinant of matrix A is (a) Infinite (b) Can't be determined (c) Insufficient information (d) Zero	2	CO1
2.	If a set A has *n* elements, then the total number of subsets of A is (a) n (b) n^2 (c) 2^n (d) $2n$	2	CO1
3.	If A = {T, A, L, E} and B = {L, A, T, E} then A ∪ B is equal to (a) {A, B, C, …, Z} (b) {} (c) {T, A, L, E} (d) None of these	2	CO1
4.	If A, B and C are square matrices of same order, then A(B+C) =? (a) BA+CA (b) AB+AC (c) AC+BC (d) None of these	2	CO1
5.	If $\begin{bmatrix} 2 & 2 \\ 8 & 6-x \end{bmatrix} = \begin{bmatrix} 4 & 2 \\ 8 & 3 \end{bmatrix}$ then x =? (a) 0 (b) 6 (c) 3 (d) 7	2	CO1

6.	The 4^{th} term of the series 2, 6, 10, ……. will be (a) 7 (6) 6 (c) 14 (d) 2	2	CO1
7.	If x – 3, x + 1, 2x – 1 are in arithmetic progression, then x is equal to (a) 4 (b) -4 (c) -6 (d) 6	2	CO1
8.	If f(x) = (x + 1)/x, then derivative of f(x) is (a) 1/x (b) -1/x (c) $-1/x^2$ (d) $1/x^2$	2	CO1
9.	Find the value of $\int 2\,dx$ (a)2 x + k (b) 1 + k (c) x^2 + k (d) log x + k	2	CO1
10.	$\int \frac{2}{\sqrt{x}} dx$ will be (a) √x + k (b) 4√x + k (c) x + k (d) $23x^{3/2}$ + k	2	CO1
	Section-B	4Q×5M=20M	
11.	Find the derivative of y= $(3x^2 -2x+5)(6x-1)$ with respect to x.	5	CO2
12.	The first term of a geometric progression is 1. The sum of the third term and fifth term is 90. Find the common ratio.	5	CO2
13.	In a survey of 500 students, it was found that 400 had taken mathematics, 300 had taken physics, and 200 had taken mathematics & physics. Find the number of students that had (i) only mathematics (ii) only physics	5	CO2
14.	A manufacturing company finds that the daily cost of producing x items of a product is given by C(x)= 240 x+8000. If each item is sold for Rs. 400, find the minimum number that must be produced and sold daily to ensure no loss.	5	CO2

	Section-C **(Attempt any three questions.)**	3Q×10M=30M	
15.	**i.** Define Set with the help of suitable examples. Also discuss the type of sets. **ii.** In a city 20 percent of the population travels by car, 50 percent travels by bus and 10 percent travels by both car and bus. Then, what percent of persons travelling by car or bus?	5 5	CO3
16.	i. Find the adjoint of the given matrix $A = \begin{bmatrix} 1 & 0 & -2 \\ 2 & 1 & 3 \\ 4 & 1 & -8 \end{bmatrix}$ ii. If there are two matrices A and B are given such that the multiplication of these matrices AB and BA are possible then comment on the order of these matrices.	7 3	CO3
17.	The average cost function (AC) for a product is given by $AC = 0.004x^2 - 0.02x - 30 + \frac{500}{x}$; where x is the output. Find (i) the total cost function (ii) the marginal cost function and marginal cost when 100 units are produced.	10	CO3
18.	The cost function for x units of a product produced and sold by a company is C(x) = 250 + $0.005x^2$ and the total revenue is given as R(x)= 4x. Find how many items should be produced to maximize the profit. What is the maximum profit?	10	CO3
	Section-D	2Q×15M=30M	
19.	Solve the system of linear equations by using any matrix method $x - y + z = 4$ $2x + y - 3z = 0$ $x + y + z = 2$ **Or** A company produces three products every day. Their production on certain day is 45 tons. It is found that the production of the third product exceeds the production of first product by 8 tons while the total production of first and third product is twice the production of second product. Find the production level of each product, using matrix method.	15	CO4
20.	The demand function for a product marketed by a company is p= $\frac{80-x}{4}$;where x is the number of units and p is the price per unit. At what value of x will there be maximum revenue? What is this maximum revenue?	15	CO4